

Field Class provide teachers in London or the neighbourhood with exceptional opportunities for acquiring a knowledge of the significance of the geological structures and formations in the home counties, and Mr. Cowham's book will show them how the facts can usefully be applied to school excursions.

*Air, Water and Food.* By Ellen H. Richards and Alpheus G. Woodman. Pp. 226. (London: Chapman and Hall, Ltd. New York: John Wiley and Sons, 1900.)

OF the many volumes which have been written on these subjects, there are few which, in the opinion of the writer, can be more safely recommended to the student of sanitary science. Each of the three subjects is introduced and fairly discussed in language which is clear, trenchant and concise.

The authors are, moreover, no mere theorists, but describe the operations of the laboratory in a business-like fashion which leaves no doubt about their practical knowledge. The diagrams are more successful as illustrations than the photographs, in which, as frequently happens, the glass apparatus has such an ill-defined and ghost-like appearance as to be unrecognisable by the unprofessional eye. In other respects the book is well got up.

J. B. C.

*Elementary Physics and Chemistry*, ii., iii. By R. A. Gregory and A. T. Simmons. Second stage, pp. vi + 140; third stage, pp. vi + 114. (London: Macmillan and Co., Ltd., 1900.)

THESE two volumes complete a work of three parts, consisting of a course of experimental illustration of the elementary principles of chemistry and physics. The syllabus of subjects considered is based on the new Code issued by the Education Department, but the descriptions are by no means confined to it. The subject-matter is arranged in the form of a succession of separate gradated lessons, each consisting of description of apparatus, method of conducting experiment, results obtained and the reasons for them, short summary, and a set of exercises. The books thus arranged seem especially valuable to teachers having to give a comprehensive course in a definite number of lessons—in Evening Continuation Schools, for instance—as the whole work to be gone through may be at once divided into sections. Numerous excellent illustrations add considerably to the utility of the volumes.

C. P. B.

*Principes D'Hygiène Coloniale.* Par Le Dr. Georges Treille. Pp. iv + 272. (Paris: Georges Carré et C. Naud, 1899.)

THIS useful little volume is addressed particularly to those who wish to inform themselves of the physical conditions of life in the tropics with a view to living there, and to those who have an indirect interest in tropical regions. The earlier portion of the volume deals with tropical climatology in general, and in particular with the climatology of the French colonies. A chapter is devoted to considering the action of the climate on bodily functions. The latter portion deals with public and domestic hygiene. In the discussion on European habitations in the tropics, one would have wished to see more stress laid on the importance of Europeans living apart from the natives—a custom which has been so universally adopted in India, and which no doubt accounts to a large extent for the comparative freedom of Europeans from malaria in that country.

We fully endorse the indictment of the use of alcohol specially in the form of absinthe, but we should have liked to see more information on measures to be taken to ensure a supply of good water for domestic purposes.

C. B. S.

## LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

### Genesis of the Vertebrate Column.

IN the review of "The Foundations of Zoology," by Prof. W. Keith Brooks, which was contained in the last number of NATURE, the reviewer quotes from him the following sentence:—"Herbert Spencer tells us that segmentation of the backbone is the inherited effect of fractures caused by bending."

Before the reader accepts this version of my view, he would do well to read §257 of "The Principles of Biology." The simplest expression of that view is contained in the criticism of Prof. Owen's "Theory of the Vertebrate Skeleton," originally published by me in the *British and Foreign Chirurgical Review* for 1858, and now appended to "The Principles of Biology." The sentence setting it forth runs thus:—

"The production of a higher, more powerful, more active creature of the same type, by whatever method it is conceived to have taken place, involved a change in the notochordal structure. Greater muscular endowments presupposed a firmer internal fulcrum—a less yielding central axis. On the other hand, for the central axis to have become firmer while remaining continuous, would have entailed a stiffness incompatible with the creature's movements. Hence, increasing density of the central axis necessarily went hand in hand with its segmentation; for strength, ossification was required; for flexibility, division into parts."

There is here no mention or thought of "fracture"—no implication of a dense part formed and then broken, but the implication of dense matter being deposited in successive separate portions, in such way as to fulfil the two requirements of strength and flexibility.

HERBERT SPENCER.

Brighton, October 21.

### Albinism and Natural Selection.

A CASE of partial albinism in fishes which has recently come under my notice is likely to be of general interest from the evidence it apparently affords of the value of the normal specific coloration of predaceous fishes, and of the serious disadvantage of conspicuous abnormalities.

A white-skinned specimen of the common hake (*Merluccius merluccius*, L.) was trawled in the Bristol Channel last week amongst a catch of normal hake, and was sent to me from Milford immediately on landing, owing to the fishermen's impression that it belonged to some rare species unknown to them.

It was, however, perfectly normal in all respects except its remarkable leanness and the absence of all pigmentation from the external skin and the inner lining of the buccal cavity and gill-covers. The pigmentation of the retina and peritoneum was normal.

In a normal hake there is a profuse black pigmentation over the upper part of the body, as well as over the inside of the mouth and gill-covers. The general appearance of a normal hake is consequently dusky; that of the abnormal specimen was white.

The lean and emaciated condition of the white hake was very striking, especially in the head region, where not only the bony ridges of the skull and cheeks projected sharply beneath the thin layer of skin, but even the lines of sculpture of the superficial bones were plainly recognisable. In a normal hake, of approximately equal length, with which I compared the specimen, these details were quite invisible, and the bony ridges were rounded off or hidden by the plumpness of the integument. In girth and weight the albino was far inferior to the normally pigmented fish. The albino measured 26½ ins. in length to the base of the caudal fin, and 6½ ins. in length of head (from snout to opercular spine). Its girth round the back of the head was 9 ins., and just behind the 10th anal finray 9½ ins. The normal hake measured 27½ ins. in length, and had the same length of head as the albino. Its girth in the same two regions was 10½ ins. and 10¼ ins. respectively. The albino weighed 4 lb. 5 oz., the normal hake 5 lb. 9½ oz., both fish being gutted in the same way.

That is to say, although the length of the albino was only 4½ per cent. less than that of the normal hake, the deficiency in girth amounted to 11 per cent. and the deficiency in weight to 23 per cent.

The question arises whether the emaciation of body, and lack of pigmentation, should be regarded as results of some disease (which was not otherwise apparent); or whether the lean condition should be attributed to the insufficient nutrition of a predaceous fish whose stalking powers had been reduced by its conspicuous appearance.

The hake is a predaceous and nocturnal fish, which preys on mackerel, herring and other active fish, especially at night.

The bulk of evidence appears to favour the view that albinism in fishes is a congenital, and not an acquired character (*cf.* colour variation in flat fishes); and I am not aware that leanness of body is specially correlated with the albino condition.

Perhaps some of your readers could refer me to other records which would throw light on this case?

Plymouth, October 10.

WALTER GARSTANG.

### Tenacity of Life of the Albatross.

SIR WILLIAM CORRY told me some time ago that on one of his steamships coming from New Zealand, an albatross, supposed to have been choked dead, kept in an ice box at a temperature which was always much below freezing point, was found to be alive at the end of fourteen days. He has been kind enough to obtain for me the following statement in writing from Captain Reed. Of course the birds mentioned in this statement could not really have been choked dead, but I think the facts are very interesting.

JOHN PERRY.

October 11.

THE bird referred to was supposed to be killed by being strangled with twine tied as tightly as possible round the neck. This twine was not removed. The beak was closed and tied and the legs crossed behind the tail and tied. It was then wrapped in an old meat cloth and put with three other birds in the return box at the end of the port snow trunk. It remained there for certainly not less than ten days at a temperature of from zero when machine blowing on that side to 18° F. when blowing on the starboard side. The snowboy complained that the bird "grunted" when he went near it with his lamp, and Mr. Coombes, the 1st Ref. Eng. brought it out. When put down on the engine-room floor, it could move its neck about and open its beak, and the eyes were open and lifelike. The lower half of the body and the legs were frozen hard. The fastening on the beak had come off. It was alive for two hours after being taken out, and was then strangled and put in the snowbox.

There was another bird treated in the same way, and hung up by the beak in the meat chamber for over four days, and then found to be alive and able to make a "grunting" noise. The temperature of the chamber was never higher than 4° F., and often 8° to 10° below zero. Mr. Coombes, then 1st Ref. Eng., now in *Star of Australia*, and Mr. Boyes, then 2nd, now 1st Ref. Eng., both declare this to be quite true.

If opportunity offers on the passage home I will try how long it is possible for these birds to live in these low temperatures.

S.S. *Star of New Zealand*, Wellington, WM. J. REED.

August 22.

### The Peopling of Australia.

IN the issue of NATURE for October 4, Mr. J. Mathew has questioned the accuracy of certain observations upon the linguistic part of his book, "Eaglehawk and Crow," which were made by me at the request of Prof. A. C. Haddon, and included by him in the review of Mr. Mathew's book in NATURE for December 28, 1899.

I shall be glad if you will permit me to reply as briefly as possible to the complaints in Mr. Mathew's letter.

Mr. Mathew charges me with being "unnecessarily caustic" in my remarks on his theories, and with attending to "petty points" instead of the main issues. To the former charge I must plead zeal for accuracy, and fear of the formation of hasty conclusions. To the second I may be allowed to say, that as the whole of Mr. Mathew's theory (linguistically at least) is based upon the "petty points," their accuracy is vital to the whole structure. Although on p. 44 of his book Mr. Mathew

disavows the fallacy that "likeness of words in sound and meaning is a proof of a common origin," he nevertheless adopts it in very many of his comparisons. Take, for example, the Malay and Central Australian words on p. 59; the south-west Australian and New Guinea words on p. 72, the examples in his chapter on the Malay element in Australian, and the satisfaction expressed in his letter to NATURE at a comparison between Australian, Malay and New Hebridean, because the "terms for father and skin are the same."

My summary of his chapter on the Malay element in Australian is quoted by Mr. Mathew in his letter as "ridiculous nonsense." I maintain that it is a perfectly fair summary of his actual words. He states on p. 5 that "Malay refers generally to the people of that race to the north of Australia without distinguishing nationality," and on page 61 that the Malay invasion came from the north. Speaking of the invaders, he says on page 61, "The straggling stream winds about here and there, touches the shore at various places and recoils back inwards," but when I state that the meaning of this is "wandering about the interior," he says the latter phrase is a "pure invention of Mr. Ray's."

Although Mr. Mathew declares in his letter that the Malays came from an indeterminable (though probably Sumatran) locality, all the Malay words in his proofs are those of the current literary or colloquial Malay, and several of them (*e.g.* tanga, gigi, kapala, bapa, rambut), are by no means the common words used by the Malayan peoples of the Archipelago. In two instances his words are incorrect: *kaka* is wrongly given *kabu* (p. 59), so as to agree with Australian words like *koko*, *kakooja*, and *duwan* (p. 60), said to mean 'ear' is probably meant for *daun*, "leaf," which only means the "external ear," *i.e.* the 'leaf of the ear,' when conjoined with *telinga*.

That Mr. Mathew believes the Malay words were "scattered all over the island continent" plainly appears from his examples. He shows so-called Malay words on the coast of New South Wales, East Queensland, and the extreme east (p. 58); others across the centre of Australia from the Gulf of Carpentaria southward, and on Cloncurry River (p. 59), and others in West Australia (p. 60).

Mr. Mathew states that in the *Journal* of the Anthropological Institute for 1894-5, I have used languages as the basis of a classification of the New Guinea Islanders. That is so, but my method is not comparable with Mr. Mathew's. I showed that certain New Guinea languages (Mottu, Keapara, &c.) should be called Melanesian because they agreed with the languages of the Melanesian islands, *almost entirely in grammar, and very largely in vocabulary*, and that others should be called non-Melanesian because they had *no agreements whatever* with the Melanesian. Can Mr. Mathew show by a similar grammatical and lexical comparison, that the Australian is related to any other group of languages? With regard to terms like 'bapa' and 'mama' for 'father' and 'mother,' my argument was that no dependence can be placed on these words to show a connection of languages. They are among the earliest vocabularies uttered by a human being, and in very many languages of the world have become appropriated to the earliest recognised human relationships.

This is not the time or place to reply to the somewhat contradictory propositions in Mr. Mathew's letter. He wishes me to prove: (1) That words of 'mama' type are not adopted words in Malay; (2) that they were not earlier in use in the East Indian Archipelago; (3) that they are not more markedly Papuan than the 'bapa' type. I may, however, be permitted to remark: (1) That words for father containing the syllable *ma* (of which *mama* is a reduplication) are the commonest in the vocabularies of the tribes of Borneo, Celebes, Philippines, &c., least subject to Malay influence, whilst words containing the syllable *ba* or *pa* are confined to the nearest connections of the Malay. Hence the words of *ma* (or *mama*) type are the original, not adopted words, and (2) were necessarily the earlier in use. Mr. Mathew's second proposition thus contradicts his first. Also (3), the languages of the Papuans in West New Guinea have forms of *bapa* for 'father,' those in Central New Guinea have *babe* or *apai*. One Papuan and all the Melanesian have forms of *ma* (*ama* or *tama*).

Mr. Mathew complains that I have not explained the New Guinea numerals. Could I do this within the limits of a review? The convergence of Australian forms towards Cape York, stated by Mr. Mathew, does not necessarily imply that the words came from New Guinea, and his examples only show that the Saibai